

CLAIMS

What is claimed is:

1. A method for forming a patterned layer comprising:
 - providing a substrate;
 - forming over the substrate a blanket target layer;
 - forming upon the blanket target layer a patterned mask layer;
 - etching vertically incompletely the blanket target layer while employing a plasma etch method and the patterned mask layer as an etch mask to form an incompletely vertically etched blanket target layer and an etch residue layer upon a sidewall of the patterned mask layer;
 - removing the patterned mask layer from the incompletely vertically etched blanket target layer;
 - etching further the incompletely vertically etched blanket target layer while employing the plasma etch method to form a further etched incompletely vertically etched blanket target layer having formed thereupon a laterally increased etch residue layer; and

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etching further the further etched incompletely vertically etched blanket target layer while employing the plasma etch method and the laterally increased etch residue layer as an etch mask to form a patterned target layer.

2. The method of claim 1 wherein the substrate is employed within a microelectronic product selected from the group consisting of integrated circuit products, ceramic substrate products and optoelectronic products.

3. The method of claim 1 wherein the blanket target layer is formed of a material selected from the group consisting of conductor materials, semiconductor materials and dielectric materials.

4. The method of claim 1 wherein the etch residue layer and the laterally increased etch residue layer are formed of a fluoropolymer etch residue material.

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5. The method of claim 1 wherein the patterned mask layer is removed employing the plasma etch method.

6. The method of claim 1 wherein the patterned mask layer is removed independent of the plasma etch method.

7. The method of claim 1 wherein:

the patterned mask layer has a linewidth of from about 0.04 to 0.13 microns;

the etch residue layer has a linewidth of from about 0.01 to about 0.03 microns; and

the laterally increased etch residue layer has a linewidth of from about 0.02 to about 0.06 microns.

8. The method of claim 1 wherein the etch residue layer is formed intrinsic to the plasma etch method.

9. A method for forming a gate electrode comprising:

 providing a semiconductor substrate;

 forming over the semiconductor substrate a blanket gate electrode material layer;

 forming upon the blanket gate electrode material layer a patterned mask layer;

 etching vertically incompletely the blanket gate electrode material layer while employing a plasma etch method and the patterned mask layer as an etch mask to form an incompletely vertically etched blanket gate electrode material layer and an etch residue layer upon a sidewall of the patterned mask layer;

 removing the patterned mask layer from the incompletely vertically etched blanket gate electrode material layer;

 etching further the incompletely vertically etched blanket gate electrode material layer while employing the plasma etch method to form a further etched incompletely vertically etched blanket gate electrode material layer having formed thereupon a laterally increased etch residue layer; and

etching further the further etched incompletely vertically etched blanket gate electrode material layer while employing the plasma etch method and the laterally increased etch residue layer as an etch mask to form a gate electrode.

10. The method of claim 9 wherein the etch residue layer and the laterally increased etch residue layer are formed of a fluoropolymer etch residue material.

11. The method of claim 9 wherein the patterned mask layer is removed employing the plasma etch method.

12. The method of claim 9 wherein the patterned mask layer is removed independent of the plasma etch method.

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13. The method of claim 9 wherein:

the patterned mask layer has a linewidth of from about 0.04 to about 0.13 microns;

the etch residue layer has a linewidth of from about 0.01 to about 0.02 microns; and

the laterally increased etch residue layer has a linewidth of from about 0.02 to about 0.04 microns.

14. The method of claim 9 wherein the etch residue layer is formed intrinsic to the plasma etch method.

15. A method for forming a gate electrode comprising:

providing a semiconductor substrate;

forming over the semiconductor substrate a blanket gate electrode material layer;

forming upon the blanket gate electrode material layer a patterned mask layer;

etching vertically incompletely the blanket gate electrode material layer while employing a fluorine and oxygen containing plasma etch method and the patterned mask layer as an etch mask to form an incompletely vertically etched blanket gate electrode material layer and an etch residue layer upon a sidewall of the patterned mask layer;

removing the patterned mask layer from the incompletely vertically etched blanket gate electrode material layer;

etching further the incompletely vertically etched blanket gate electrode material layer while employing the plasma etch method to form a further etched incompletely vertically etched blanket gate electrode material layer having formed thereupon a laterally increased etch residue layer; and

etching further the further etched incompletely vertically etched blanket gate electrode material layer while employing the plasma etch method and the laterally increased etch residue layer as an etch mask to form a gate electrode.

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16. The method of claim 15 wherein the etch residue layer and the laterally increased etch residue layer are formed of a fluoropolymer etch residue material.

17. The method of claim 15 wherein the patterned mask layer is removed employing the plasma etch method.

18. The method of claim 15 wherein the patterned mask layer is removed independent of the plasma etch method.

19. The method of claim 15 wherein:

the patterned mask layer has a linewidth of from about 0.09 to about 0.13 microns;

the etch residue layer has a linewidth of from about 0.01 to about 0.03 microns; and

the laterally increased etch residue layer has a linewidth of from about 0.02 to about 0.06 microns.

20. The method of claim 15 wherein the etch residue layer is formed intrinsic to the plasma etch method.